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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,684	02/20/2004	Hai-Zhi Song	040070	3691
23850	7590	01/12/2005	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			DICKEY, THOMAS L	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/781,684

Applicant(s)

SONG, HAI-ZHI

Examiner

Thomas L Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
4a) Of the above claim(s) 12-16 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-7,9 and 11 is/are rejected.
7) ☒ Claim(s) 8 and 10 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 02/20/2004.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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DETAILED ACTION

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Petroff 5,192,709 is considered pertinent because it supplies an enabling disclosure for the claimed "two-dimensional carrier gas" and "quantum dot."

Election/Restriction

2. Applicant's election without traverse of Group II, in the Paper filed 10/12/2004 is acknowledged. Group I, claims 12-16, are withdrawn. Group II and the linking claim (a necessary method of making the device claimed in a group II claim), claims 1-11, are herein considered.

Oath/Declaration

3. The oath/declaration filed on 02/20/2004 is acceptable.

Drawings

4. The formal drawings filed on 02/20/2004 are acceptable.

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Priority

5. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

6. The Information Disclosure Statement filed on 02/20/2004 has been considered.

Specification

7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7,9, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by KIEHL (5,559,343).

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With regard to claims 1-7, and 9 Kiehl discloses a quantum semiconductor device with a first semiconductor layer 14a formed on a substrate 11 and having a two-dimensional carrier gas formed in; a three-dimensionally grown island quantum dot 14a formed on the first semiconductor layer 14a; a second semiconductor layer 14b formed on the first semiconductor layer 14a, covering the quantum dot 14a; a gate electrode 25b connected to another three-dimensionally grown island quantum dot dot-shaped structure 21b caused to formed by crystal strains on the surface of the second semiconductor layer 14b at a position above the quantum dot 14a, source 26/drain 25a regions connected to both ends of a channel region 12 defined by a depletion region DP formed in a region of the first semiconductor layer 14a which is below the oxide layer 23, and an oxide layer 23 formed on two sides of the dot-shaped structure 21b on the surface of the second semiconductor layer 14b.

The applicant's claims 2-5 does not distinguish over the Kiehl reference regardless of the process used to form the claimed crystal strains, three-dimensionally grown island quantum dots and dot-shaped structures 21a and 21b, and depletion region DP, because only the final product is relevant, not the recited processes of generating the crystal strains in the surface of the second semiconductor layer due to the presence of the quantum dot 14a, self-assembling the quantum dot and the dot-shaped structure by S-K mode, and forming the depletion region due to the presence of the oxide layer.

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Note that a "product by process" claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

With regard to claim 11, which is a necessary method of making the quantum semiconductor device of claim 1, Kiehl discloses a method of making said quantum semiconductor device comprising the steps of forming on a substrate 11 a first semiconductor layer 14a with a two-dimensional carrier gas formed in; forming a quantum dot 14a on the first semiconductor layer 14a; forming a second semiconductor layer 14b, covering the quantum dot 14a; forming a dot-shaped structure 21b on the surface of the second semiconductor at a position above the quantum dot 14a due to strains generated in the surface of the second semiconductor layer 14b due to the presence of the quantum dot 14a; and forming an ox-

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ide layer 23 on the surface of the second semiconductor layer 14b on both side of the dot-shaped structure 21b with the dot-shaped structure 21b as a mark.

Note figures 5, 8A-8G, 11 and column 6 lines 1-4 and 35-54, column 8 lines 24-67, column 9 lines 5-30, and column 10 lines 10-14 of Kiehl.

Allowable Subject Matter

9. Claims 8 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas L. Dickey
Patent Examiner
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12/04